Applied Dynamical Systems Seminar

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Spatial Dynamics of A Diffusive Predator-Prey Model with Stage Structure

Abstract:

In this talk, we propose a nonlocal and time-delayed reaction-diffusion predator-prey model with stage structure. It is assumed that prey individuals undergo two stages, immature and mature, and the conversion of consumed prey biomass into predator biomass has a retardation. In terms of the principal eigenvalue of a nonlocal elliptic eigenvalue problem, we establish the uniform persistence and global extinction for the model. In particular, the uniform persistence implies the existence of a positive steady state.

Finally, we investigate a spatially homogeneous predator-prey system and show that such a system admits complicated dynamics due to the non-local delay in the prey equation.